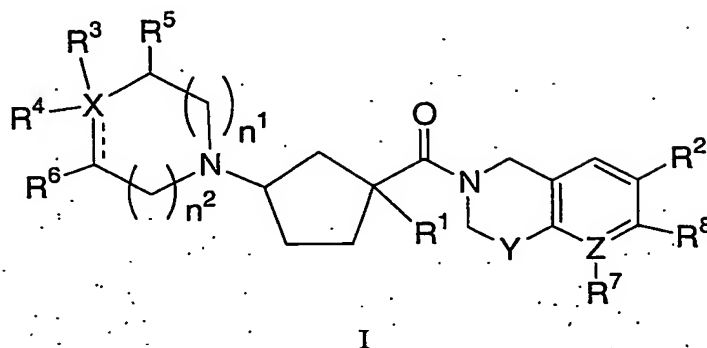


## WHAT IS CLAIMED IS:

1. A compound represented by formula I:



or a pharmaceutically acceptable salt thereof, or an individual diastereomer thereof, wherein:

X is C, N, O or S;

Y is O, S, SO, SO<sub>2</sub>, or NR<sup>9</sup>;

Z is C or N;

R<sup>1</sup> is hydrogen, -C<sub>0-6</sub>alkyl-W-(C<sub>1-6</sub>alkyl)-, -(C<sub>0-6</sub>alkyl)-W-(C<sub>0-6</sub>alkyl)-(C<sub>3-7</sub>cycloalkyl)-(C<sub>0-6</sub>alkyl), -(C<sub>0-6</sub>alkyl)-W-phenyl, or -(C<sub>0-6</sub>alkyl)-W-heterocycle, wherein the alkyl, phenyl, heterocycle and the cycloalkyl are optionally substituted with 1-7 independent halo, hydroxy, -O-C<sub>1-3</sub>alkyl, trifluoromethyl, C<sub>1-3</sub>alkyl, -O-C<sub>1-3</sub>alkyl, -CO<sub>2</sub>R<sup>10</sup>, -CN, -NR<sup>10</sup>R<sup>10</sup>, -NR<sup>10</sup>COR<sup>10</sup>, -NR<sup>10</sup>SO<sub>2</sub>R<sup>11</sup>, or -CONR<sup>10</sup>R<sup>10</sup> substituents;

W is a single bond, -O-, -S-, -SO-, -SO<sub>2</sub>-, -CO-, -CO<sub>2</sub>-, -CONR<sup>10</sup>- or -NR<sup>9</sup>-;

R<sup>2</sup> is -halo, -C<sub>0-6</sub>alkyl, C<sub>0-6</sub>alkyl-W-C<sub>1-6</sub>alkyl, C<sub>0-6</sub>alkyl-W-C<sub>3-7</sub>cycloalkyl, C<sub>0-6</sub>alkyl-W-phenyl, or C<sub>0-6</sub>alkyl-W-heterocycle, wherein the C<sub>1-6</sub>alkyl, C<sub>3-7</sub>cycloalkyl, phenyl and heterocycle optionally are independently substituted with 1-6 halo, trifluoromethyl, -CN, -C<sub>1-6</sub>alkyl, or hydroxy substituents;

R<sup>3</sup> is hydrogen, -(C<sub>0-6</sub>alkyl)-phenyl, -(C<sub>0-6</sub>alkyl)-heterocycle, -(C<sub>0-6</sub>alkyl)-C<sub>3-7</sub>cycloalkyl, -(C<sub>0-6</sub>alkyl)-CO<sub>2</sub>R<sup>10</sup>, -(C<sub>0-6</sub>alkyl)-(alkene)-CO<sub>2</sub>R<sup>10</sup> (C<sub>0-6</sub>alkyl)-SO<sub>3</sub>H, -(C<sub>0-6</sub>alkyl)-W-C<sub>0-4</sub>alkyl, -(C<sub>0-6</sub>alkyl)-CONR<sup>10</sup>-phenyl, or -(C<sub>0-6</sub>alkyl)-CONR<sup>12</sup>-V-CO<sub>2</sub>R<sup>10</sup>, and wherein R<sup>3</sup> is nothing when X is O, and wherein C<sub>0-6</sub>alkyl is optionally substituted with 1-5 independent halo, hydroxy, -C<sub>0-6</sub>alkyl, -O-C<sub>1-3</sub>alkyl, trifluoromethyl, or -C<sub>0-2</sub>alkyl-phenyl substituents, and wherein the phenyl, heterocycle, cycloalkyl, and C<sub>0-4</sub>alkyl is optionally substituted with 1-5 independent halo, trifluoromethyl, hydroxy, C<sub>1-3</sub>alkyl, -O-C<sub>1-3</sub>alkyl, -C<sub>0-3</sub>-CO<sub>2</sub>R<sup>10</sup>, -CN, -NR<sup>10</sup>R<sup>10</sup>, -CONR<sup>10</sup>R<sup>10</sup>, or -C<sub>0-3</sub>-heterocycle substituents, and wherein the phenyl and heterocycle may be fused to another heterocycle, which itself optionally may be substituted with 1-2 independently hydroxy, halo, -CO<sub>2</sub>R<sup>10</sup>,

or -C<sub>1-3</sub>alkyl substituents, and where alkene is optionally substituted with 1-3 independently halo, trifluoromethyl, C<sub>1-3</sub>alkyl, phenyl, or heterocycle substituents;

V is C<sub>1-6</sub>alkyl or phenyl;

R<sup>12</sup> is hydrogen, C<sub>1-4</sub>alkyl, or R<sup>12</sup> is joined via a 1-5 carbon tether to one of the carbons of V to form a ring;

R<sup>4</sup> is nothing when X is either O, or N or when a double bond joins the carbons to which R<sup>3</sup> and R<sup>6</sup> are attached, or R<sup>4</sup> is hydroxy, C<sub>1-6</sub>alkyl, C<sub>1-6</sub>alkyl-hydroxy, -O-C<sub>1-3</sub>alkyl, -CO<sub>2</sub>R<sup>10</sup>, -CONR<sup>10</sup>R<sup>10</sup>, or -CN;

or R<sup>3</sup> and R<sup>4</sup> are joined together to form a 1H-indenyl, 2,3-dihydro-1H-indenyl, 2,3-dihydro-benzofuranyl, 1,3-dihydro-isobenzofuranyl, 2,3-dihydro-benzothiofuranyl, 1,3-dihydro-isobenzothiofuranyl, 6H-cyclopenta[d]isoxazol-3-yl, cyclopentanyl, or cyclohexanyl ring, wherein the ring formed optionally is substituted with 1-5 independently halo, trifluoromethyl, hydroxy, C<sub>1-3</sub>alkyl, -O-C<sub>1-3</sub>alkyl, -C<sub>0-3</sub>-CO<sub>2</sub>R<sup>10</sup>, -CN, -NR<sup>10</sup>R<sup>10</sup>, -CONR<sup>10</sup>R<sup>10</sup>, or -C<sub>0-3</sub>-heterocyclyl substituents;

or R<sup>3</sup> and R<sup>5</sup> or R<sup>4</sup> and R<sup>6</sup> are joined together to form a phenyl or heterocyclyl ring, wherein the ring is optionally substituted with 1-7 independent halo, trifluoromethyl, hydroxy, C<sub>1-3</sub>alkyl, -O-C<sub>1-3</sub>alkyl, -CO<sub>2</sub>R<sup>10</sup>, -CN, -NR<sup>10</sup>R<sup>10</sup>, or -CONR<sup>10</sup>R<sup>10</sup> substituents;

R<sup>5</sup> and R<sup>6</sup> are independently hydrogen, hydroxy, C<sub>1-6</sub>alkyl, C<sub>1-6</sub>alkyl-CO<sub>2</sub>R<sup>10</sup>, C<sub>1-6</sub>alkyl-hydroxy, -O-C<sub>1-3</sub>alkyl, or halo, or =O, when R<sup>5</sup> or R<sup>6</sup> is connected to the ring via a double bond;

when Z = C, R<sup>7</sup> is hydrogen, hydroxy, halo, C<sub>1-6</sub>alkyl optionally substituted with 1-6 fluoro, -O-C<sub>1-6</sub>alkyl optionally substituted with 1-6 fluoro, -NR<sup>10</sup>R<sup>10</sup>, -NR<sup>10</sup>CO<sub>2</sub>R<sup>11</sup>, -NR<sup>10</sup>CONR<sup>10</sup>R<sup>10</sup>, -NR<sup>10</sup>-SO<sub>2</sub>-NR<sup>10</sup>R<sup>10</sup>, -NR<sup>10</sup>-SO<sub>2</sub>-R<sup>11</sup>, heterocycle, -CN, -CONR<sup>10</sup>R<sup>10</sup>, -CO<sub>2</sub>R<sup>10</sup>, -NO<sub>2</sub>, -S-R<sup>10</sup>, -SO-R<sup>11</sup>, -SO<sub>2</sub>-R<sup>11</sup>, or -SO<sub>2</sub>-NR<sup>11</sup>R<sup>11</sup>;

when Z = N, R<sup>7</sup> is nothing or oxide (resulting in a pyridine N-oxide);

R<sup>8</sup> is hydrogen, C<sub>1-6</sub>alkyl, trifluoromethyl, trifluoromethoxy, chloro, fluoro, bromo, or phenyl;

R<sup>9</sup> is SO<sub>2</sub>R<sup>11</sup>, COR<sup>10</sup>, CONHR<sup>10</sup>, CO<sub>2</sub>R<sup>11</sup>, or SO<sub>2</sub>NHR<sup>10</sup>;

R<sup>10</sup> is hydrogen, -C<sub>1-6</sub>alkyl, benzyl, phenyl, or -C<sub>0-6</sub>alkyl-C<sub>3-6</sub>cycloalkyl, optionally substituted with 1-3 independent halo, C<sub>1-3</sub>alkyl, C<sub>1-3</sub>alkoxy or trifluoromethyl substituents;

R<sup>11</sup> is C<sub>1-6</sub>alkyl, -C<sub>0-6</sub>alkyl-C<sub>3-6</sub>cycloalkyl, benzyl or phenyl, optionally substituted with 1-3 independent halo, C<sub>1-3</sub>alkyl, C<sub>1-3</sub>alkoxy or trifluoromethyl substituents;

n<sup>1</sup> and n<sup>2</sup> are independently 0, 1 or 2, wherein the sum of n<sup>1</sup> and n<sup>2</sup> is 0, 1, 2, or 3; and the dashed line represents a single or a double bond.

2. The compound of Claim 1, wherein X is C.

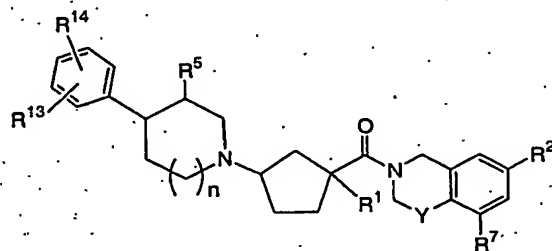
3. The compound of Claim 1, wherein X is O.

4. The compound of Claim 1, wherein X is N.

5. The compound of Claim 1, wherein

$R^3$  and  $R^4$  are joined together to form a 1H-indenyl, 2,3-dihydro-1H-indenyl, 2,3-dihydro-benzofuranyl, 1,3-dihydro-isobenzofuranyl, 2,3-dihydro-benzothiofuranyl, 1,3-dihydro-isobenzothiofuranyl, 6H-cyclopenta[d]isoxazol-3-yl, cyclopentanyl, or cyclohexanyl ring, wherein the ring formed optionally is substituted with 1-5 independently halo, trifluoromethyl, hydroxy,  $C_{1-3}$ alkyl, -O- $C_{1-3}$ alkyl, - $C_{0-3}$ -CO $2R^{10}$ , -CN, -NR $^{10}R^{10}$ , -CONR $^{10}R^{10}$ , or - $C_{0-3}$ -heterocyclyl substituents; or  $R^3$  and  $R^5$  or  $R^4$  and  $R^6$  are joined together to form a phenyl or heterocyclyl ring, wherein the ring is optionally substituted with 1-7 independent halo, trifluoromethyl, hydroxy,  $C_{1-3}$ alkyl, -O- $C_{1-3}$ alkyl, -CO $2R^{10}$ , -CN, -NR $^{10}R^{10}$ , or -CONR $^{10}R^{10}$  substituents.

6. The compound of Claim 1, represented by formula Ia:



(Ia)

or pharmaceutically acceptable salts and individual diastereomers thereof, wherein  $R^1$ ,

$R^2$ ,  $R^5$ ,  $R^7$ , and Y are defined as in Claim 1;

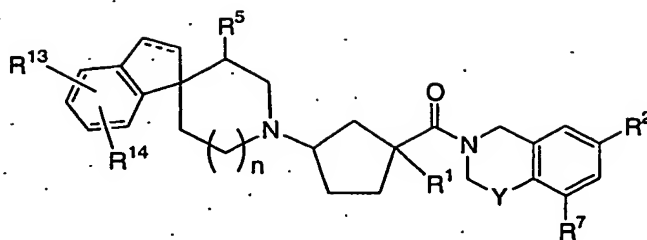
wherein  $R^{13}$  and  $R^{14}$  are independently hydrogen, halo, trifluoromethyl, hydroxy,  $C_{1-3}$ alkyl, -O- $C_{1-3}$ alkyl, - $C_{0-3}$ -CO $2H$ , - $C_{0-3}$ -CO $2C_{1-3}$ alkyl, -CN, or - $C_{0-3}$ -heterocycle;

or  $R^{13}$  and  $R^{14}$  are joined together to form a heterocycle which is fused to the phenyl ring, and which itself may be unsubstituted or substituted with 1-2 independent hydroxy, halo, -CO $2R^{10}$ , or -

$C_{1-3}$ alkyl substituents; and

$n$  is 0, 1, or 2.

7. The compound of Claim 1, represented by formula Ib:



(Ib)

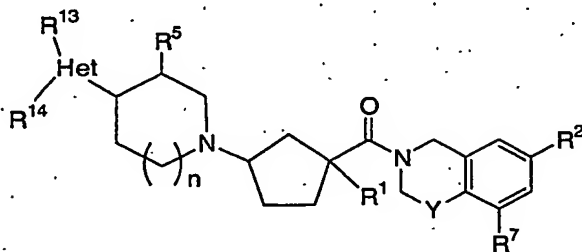
or pharmaceutically acceptable salts and individual diastereomers thereof, wherein R<sup>1</sup>, R<sup>2</sup>, R<sup>5</sup>, R<sup>7</sup>, and Y are defined as in Claim 1;

R<sup>13</sup> and R<sup>14</sup> are independently hydrogen, halo, trifluoromethyl, hydroxy, -C<sub>1-3</sub>alkyl, -O-C<sub>1-3</sub>alkyl, -C<sub>0-3</sub>-CO<sub>2</sub>H, -C<sub>0-3</sub>-CO<sub>2</sub>C<sub>1-3</sub>alkyl, -CN, or -C<sub>0-3</sub>-heterocycle;

or R<sup>13</sup> and R<sup>14</sup> are joined together to form a heterocycle which is fused to the phenyl ring, and which itself may be unsubstituted or substituted with 1-2 independent hydroxy, halo, -CO<sub>2</sub>R<sup>10</sup>, or -C<sub>1-3</sub>alkyl substituents; and

$n$  is 0, 1, or 2.

8. The compound of Claim 1, represented by formula 1c:



(Ic)

or pharmaceutically acceptable salts and individual diastereomers thereof, wherein R<sup>1</sup>, R<sup>2</sup>, R<sup>5</sup>, R<sup>7</sup>, and Y are defined as in Claim 1;

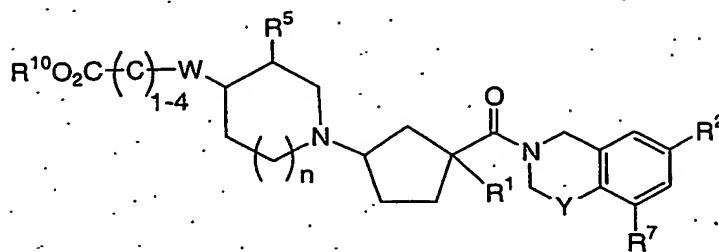
wherein R<sup>13</sup> and R<sup>14</sup> are independently hydrogen, halo, trifluoromethyl, hydroxy, -C<sub>1</sub>-3alkyl, -O-C<sub>1</sub>-3alkyl, -C<sub>0</sub>-3-CO<sub>2</sub>H, -C<sub>0</sub>-3-CO<sub>2</sub>C<sub>1</sub>-3alkyl, -CN, or -C<sub>0</sub>-3-heterocycle;

or R<sup>13</sup> and R<sup>14</sup> are joined together to form a heterocycle which is fused to the phenyl ring, and which itself may be unsubstituted or substituted with 1-2 independent hydroxy, halo, -CO<sub>2</sub>R<sup>10</sup>, or -C<sub>1-3</sub>alkyl substituents;

$n$  is 0, 1, or 2; and

Het is a heterocycle.

9. The compound of Claim 1, represented by formula Id:



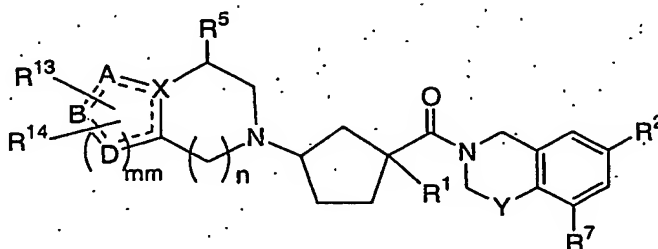
(Id)

5 or pharmaceutically acceptable salts and individual diastereomers thereof, wherein  $R^1$ ,  $R^2$ ,  $R^5$ ,  $R^7$ ,  $R^{10}$ , Y, and W are as defined in Claim 1;

n is 0, 1, or 2; and

$C_{1-4}$  carbon chain is optionally substituted with 1-4 independent halo, hydroxy,  $-C_0-$ alkyl,  $-O-C_{1-3}$ alkyl, trifluoromethyl, or  $-C_{0-2}$ alkyl-phenyl substituents; or the  $C_{1-4}$  carbon chain is part of  
10 a  $C_{3-7}$ cycloalkyl ring.

10. The compound of Claim 1, represented by formula Ie:



(Ie)

15 or pharmaceutically acceptable salts and individual diastereomers thereof, wherein  $R^1$ ,  $R^2$ ,  $R^5$ ,  $R^7$ ,  $R^{13}$ ,  $R^{14}$ , X, and Y are as defined in Claim 1;

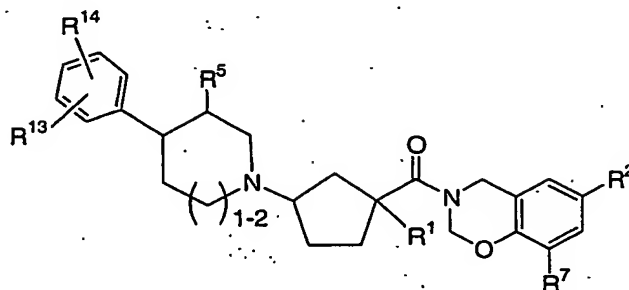
n is 0, 1, or 2;

the dotted lines represent an optional bond;

mm is 1 or 2, and

20 A, B, and D are each independently C, N, O, or S; or A, B, and D, in combination with mm = 2, form a phenyl ring; or in combination form a heterocycle when at least one of X, A, B, D is N, O, or S.

11. The compound of Claim 1, represented by formula If:



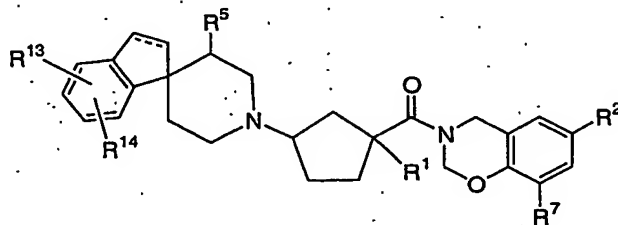
(If)

or pharmaceutically acceptable salts and individual diastereomers thereof, wherein  $R^1$ ,  $R^2$ ,  $R^5$ ,  $R^7$ ,  $R^{13}$ , and  $R^{14}$ , are as defined for Claim 1;

or wherein  $R^{13}$  and  $R^{14}$  are joined together to form a heterocycle fused to the phenyl ring;

and wherein the heterocycle is itself optionally substituted with 1-2 independent hydroxy, halo,  $-CO_2R^{10}$ , or  $-C_{1-3}alkyl$  substituents.

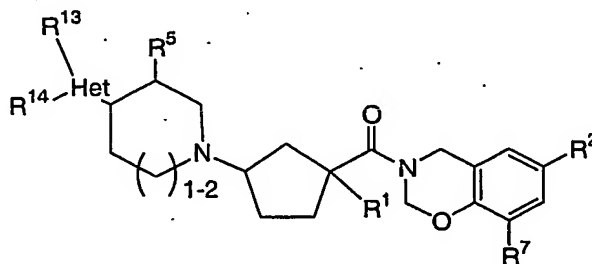
12. The compound of Claim 1, represented by formula Ig:



(Ig)

or pharmaceutically acceptable salts and individual diastereomers thereof, wherein the dashed line represents an optional bond and  $R^1$ ,  $R^2$ ,  $R^5$ ,  $R^7$ ,  $R^{13}$ , and  $R^{14}$  are as defined in Claim 1.

13. The compound of Claim 1, represented by formula Ih:



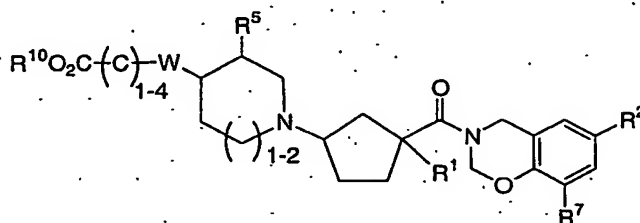
(Ih)

or pharmaceutically acceptable salts and individual diastereomers thereof, wherein  $R^1$ ,  $R^2$ ,  $R^5$ ,  $R^7$ ,  $R^{13}$ , and  $R^{14}$  are as defined in Claim 1; and

Het is a heterocycle.

5

14. The compound of Claim 1, represented by formula Ii:



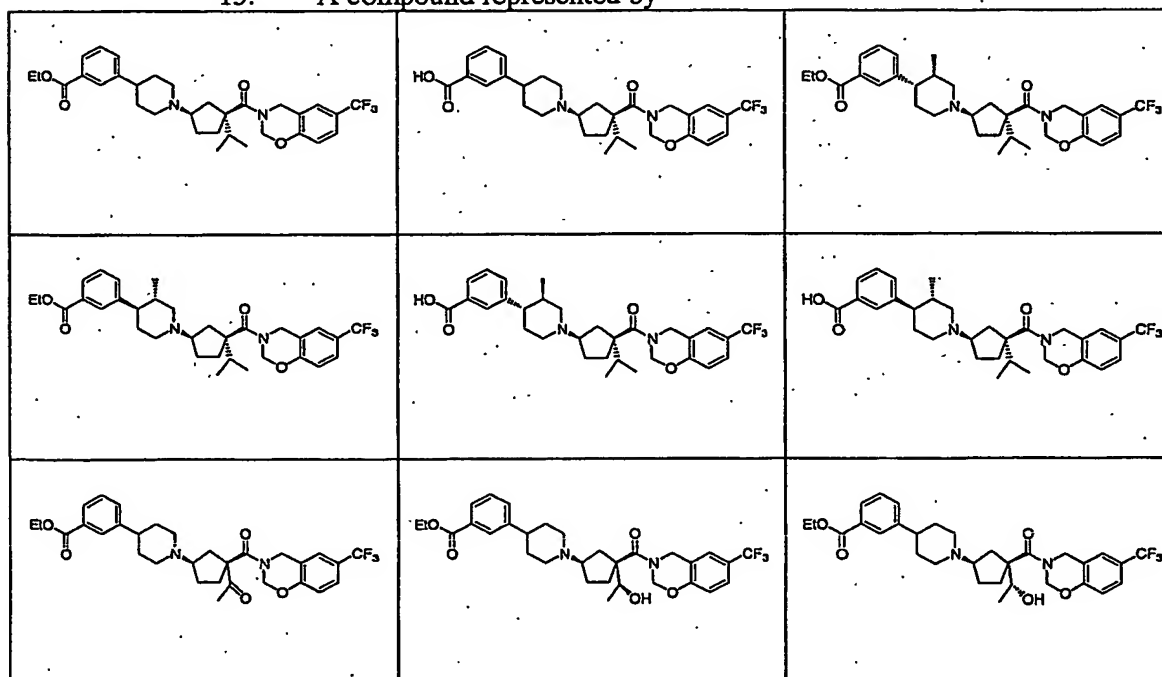
(Ii)

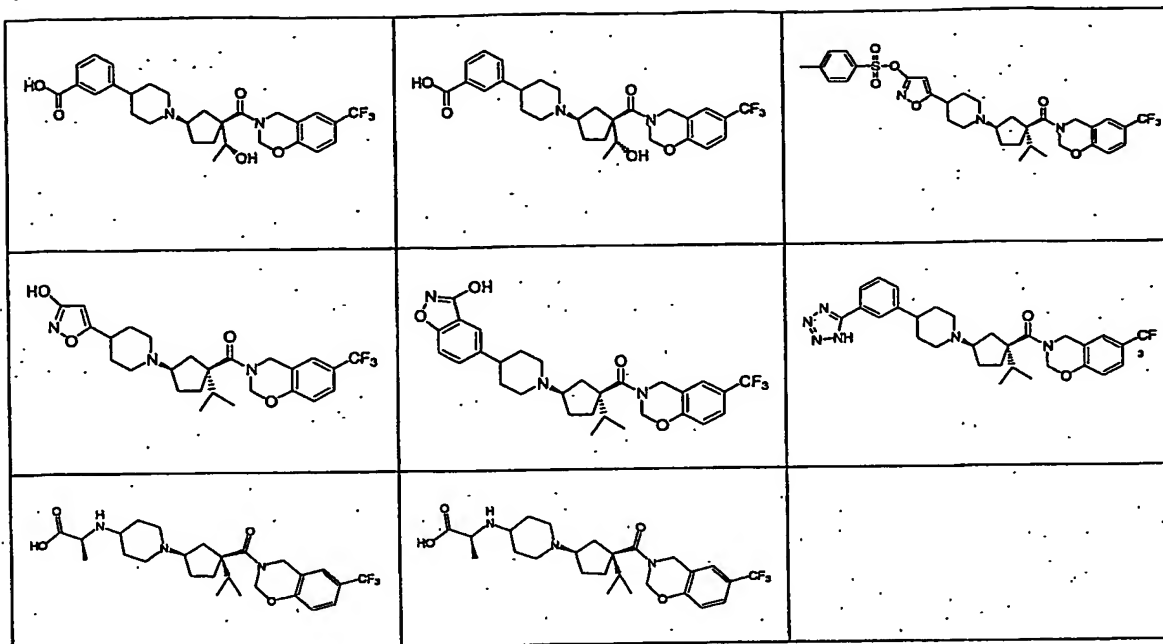
or pharmaceutically acceptable salts and individual diastereomers thereof, wherein  $R^1$ ,  $R^2$ ,  $R^5$ ,  $R^7$ ,  $R^{10}$ , and W are defined as in Claim 1; and

10

wherein the  $C_{1-4}$  carbon chain is optionally substituted with 1-4 independent halo, hydroxy,  $-C_{0-6}$ alkyl,  $-O-C_{1-3}$ alkyl, trifluoromethyl, or  $-C_{0-2}$ alkyl-phenyl substituents.

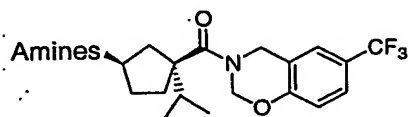
15. A compound represented by



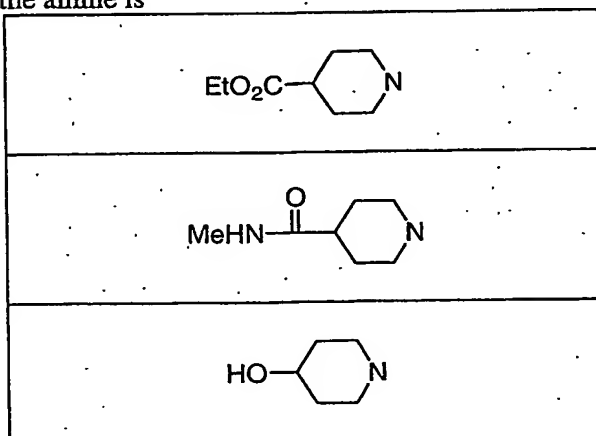


or a pharmaceutically acceptable salt or individual diastereomer thereof.

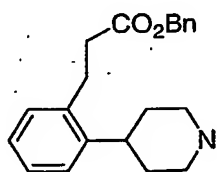
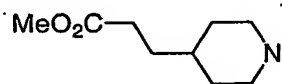
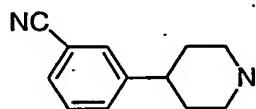
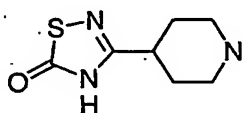
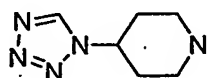
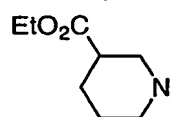
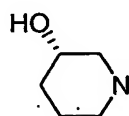
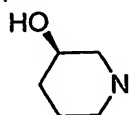
16. A compound represented by

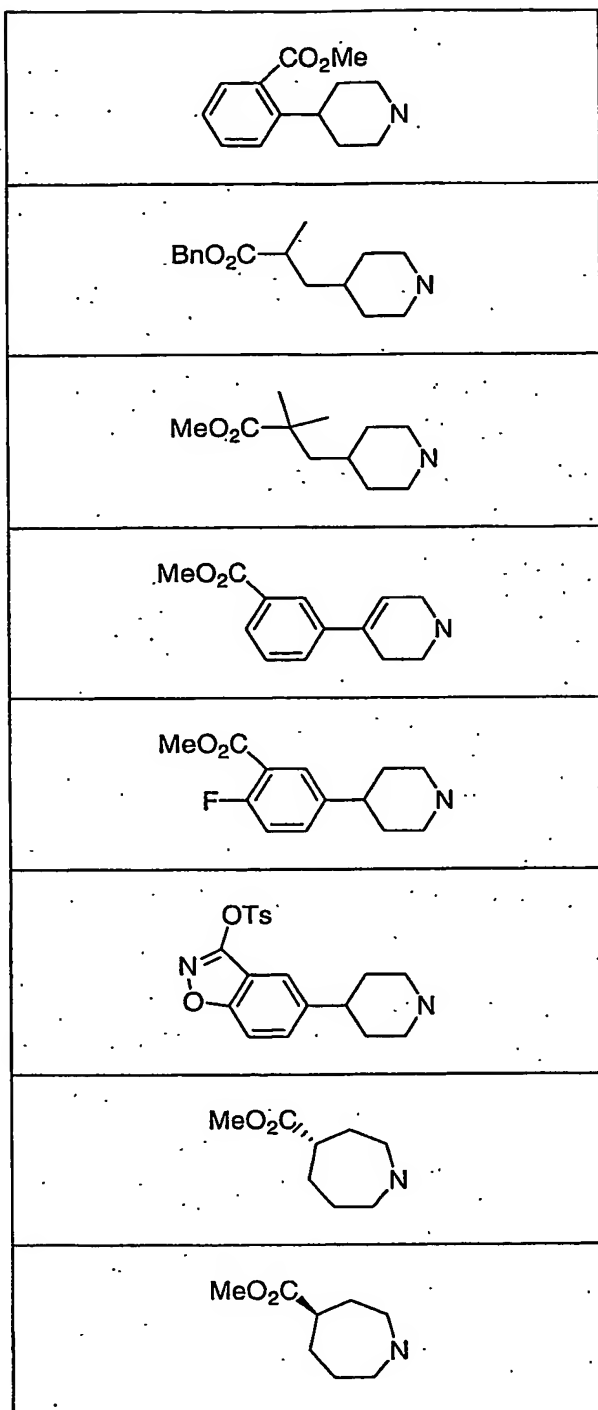


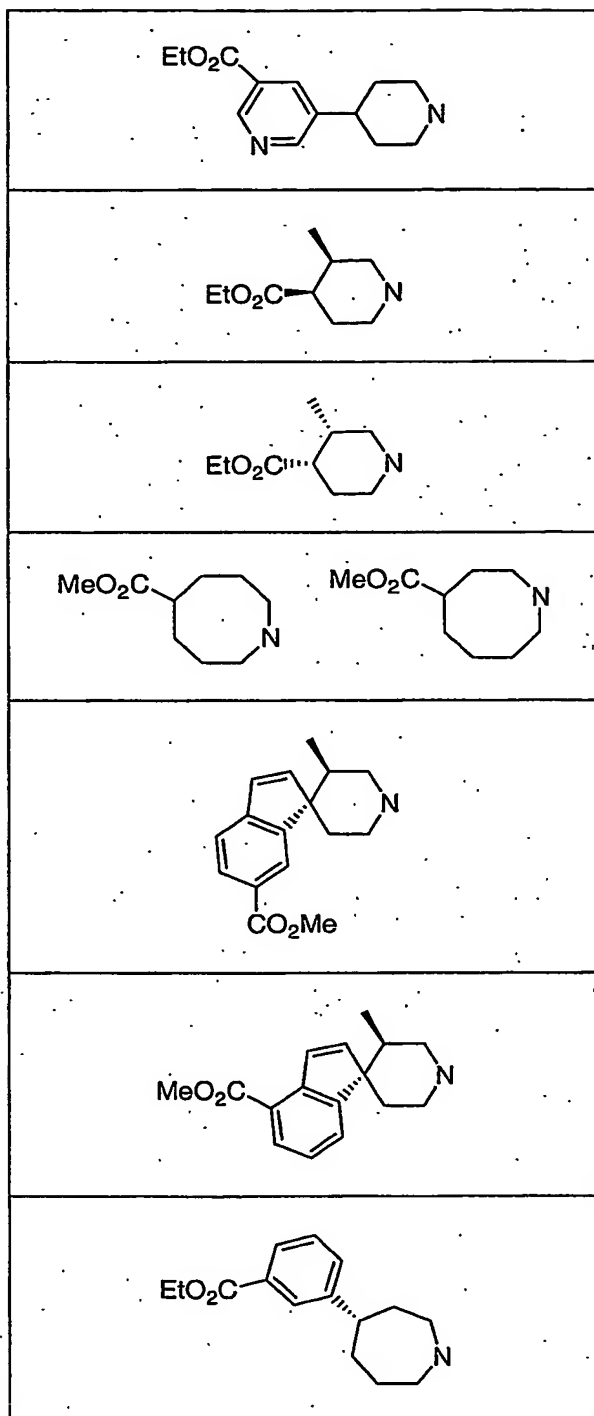
5 wherein the amine is

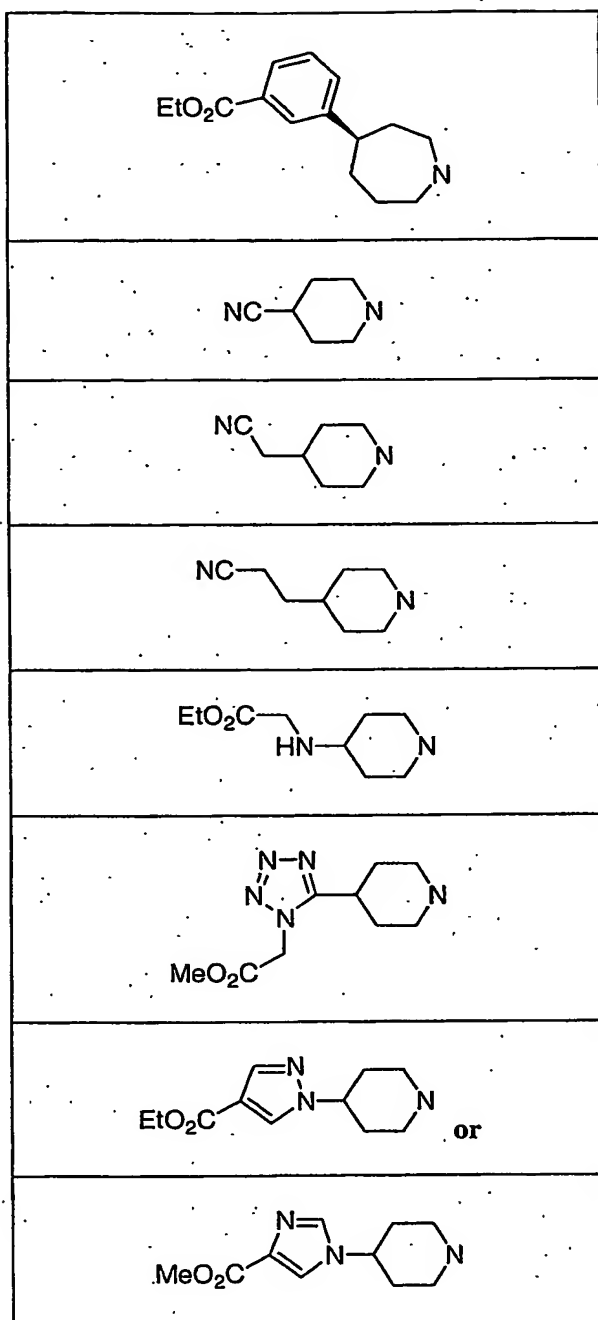






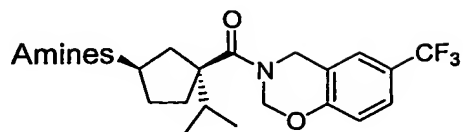






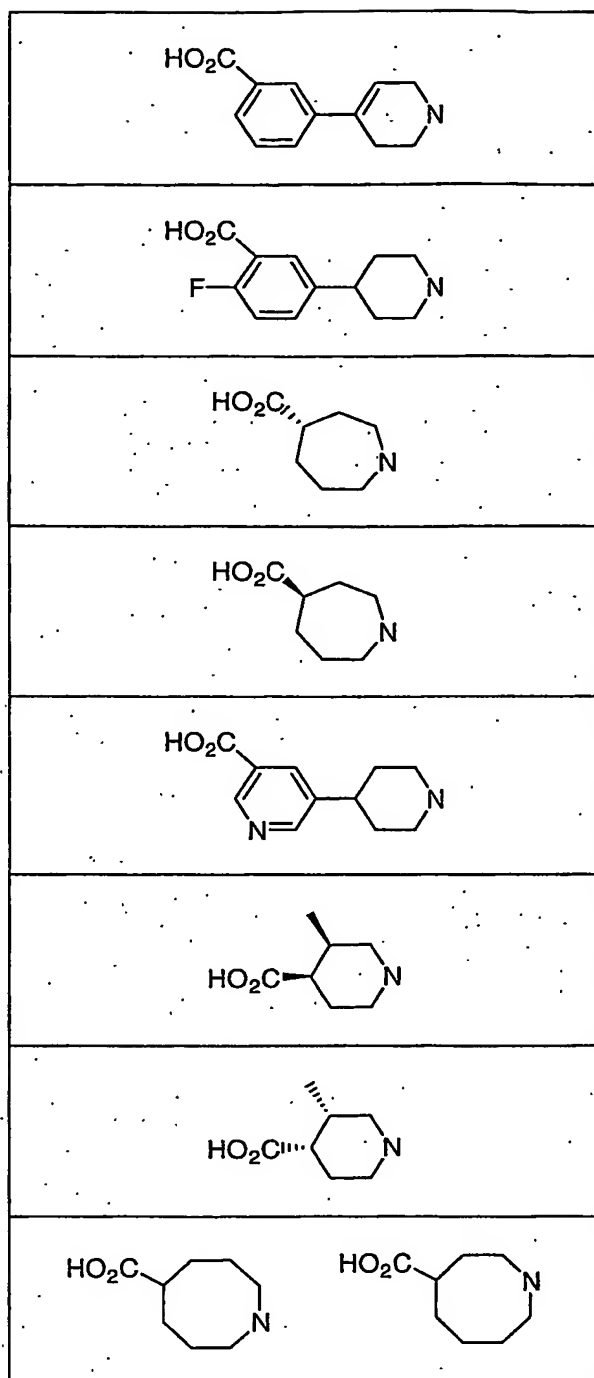
or a pharmaceutically acceptable salt or individual diastereomer thereof.

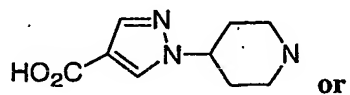
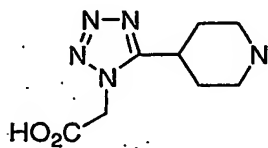
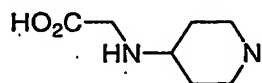
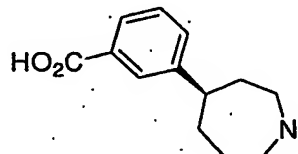
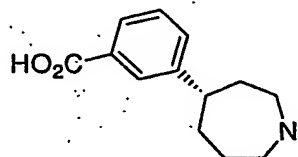
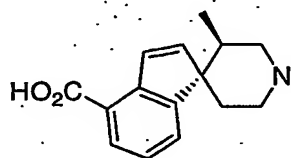
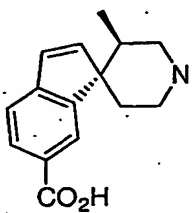
17. A compound represented by



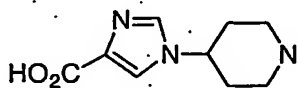
wherein amine is

<chem>OC(=O)C1CCNCC1</chem>
<chem>OC(=O)C1CCNCC1</chem>
<chem>OC(=O)CC1CCNCC1</chem>
<chem>OC(=O)CC1=CC=C(C=C1)C2CCNCC2</chem>
<chem>OC(=O)C1=CC=C(C=C1)C2CCNCC2</chem>
<chem>OC(=O)C(C)CC1CCNCC1</chem>
<chem>OC(=O)C(C)(C)CC1CCNCC1</chem>



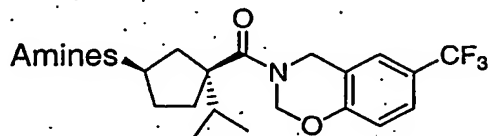


or

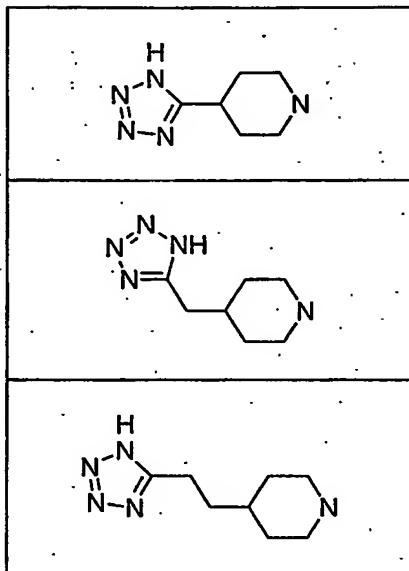


or a pharmaceutically acceptable salt or individual diastereomer thereof.

18. A compound represented by

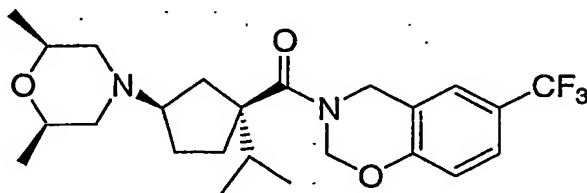


5 wherein amine is



or a pharmaceutically acceptable salt or individual diastereomer thereof.

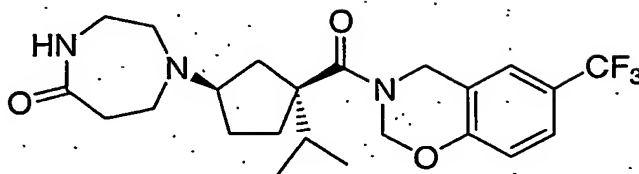
19. A compound represented by



10 or a pharmaceutically acceptable salt or individual diastereomer thereof.

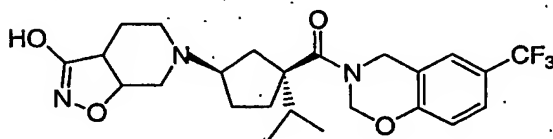
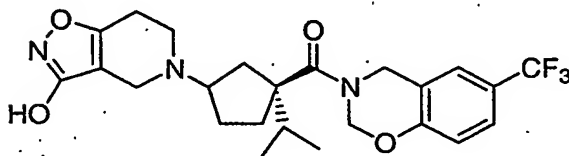
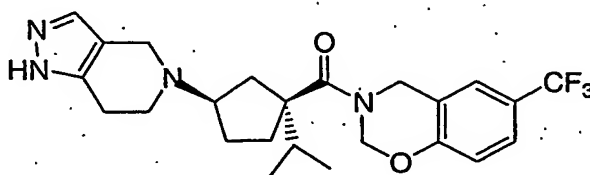


20. A compound represented by



or a pharmaceutically acceptable salt or individual diastereomer thereof.

21. A compound represented by



or a pharmaceutically acceptable salt or individual diastereomer thereof.

22. A pharmaceutical composition which comprises an inert carrier and a compound of Claim 1.

23. A method for modulation of chemokine receptor activity in a mammal which comprises the administration of an effective amount of the compound of Claim 1.

24. A method for treating, ameliorating, controlling or reducing the risk of an inflammatory and immunoregulatory disorder or disease which comprises the administration to a patient of an effective amount of the compound of Claim 1.

5 25. A method for treating, ameliorating, controlling or reducing the risk of rheumatoid arthritis which comprises the administration to a patient of an effective amount of the compound of Claim 1.